FUEL TECH
Technologies to enable clean efficient energy™

Douglas W. Kirk
Regional Sales Manager

September 3, 2008

Che McFarlin
Project Manager
Systems Assessment & Facility Siting Division
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

DOCKET
07-AFC-9
DATE SEP 0 3 2008
RECD. SEP 1 8 2008

Re: Canyon Energy Project

Mr. McFarlin:

In regard to the pending license to construct the Canyon Energy Project, I am certain SCR technology, and the required ammonia reagent will be recommended to meet NOx emissions limits.

There is no longer a need to permit this project with ammonia. The risk to the community and the site to store and transport ammonia, in any form or concentration, is no longer necessary. Safe and available urea solutions or solids can be and should be used for this project. Fuel Tech has developed a process almost identical in scope and overall cost to ammonia vaporizers to safely and effectively convert urea to ammonia for SCR use.

I have enclosed some basic information and would welcome any additional questions from the CEC or proposed developers.

Thank you,

Douglas W. Kirk

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NO$_x$OUT ULTRA®

NO$_x$ Reduction Process

TECHNICAL BENEFITS

- Simplified process, highly efficient urea conversion
- Non-hazardous materials throughout
- Low pressure operation
- Process controls designed to follow load with minimal time lag and facilitate rapid system shutdown
- Proven urea delivery system and components
- Liquid reagent system easily modified for dry urea feedstock
- Backed by Fuel Tech's proven start-up, optimization, and service experience

FUEL TECH®

Technology for a renewed environment™

Smart, safe, and simple... NO$_X$OUT ULTRA® provides SCR ammonia supply without the headaches of hazardous chemical handling.

Selective catalytic reduction (SCR) has become the standard for meeting the most stringent NO$_X$ reduction requirements for power generating facilities. Until recently, NO$_X$ reduction using SCR has employed anhydrous ammonia (NH_3) as the reducing agent, requiring that the operators of these systems manage the transportation, safety issues, and costs associated with handling this highly hazardous chemical.

Fuel Tech's NO$_X$OUT ULTRA® system is a new alternative that offers an ammonia feed from a safe urea supply. Available for new SCR systems and as a retrofit to existing applications, NO$_X$OUT ULTRA® is a cost-effective solution that simplifies SCR operation.

Urea vs. NH_3

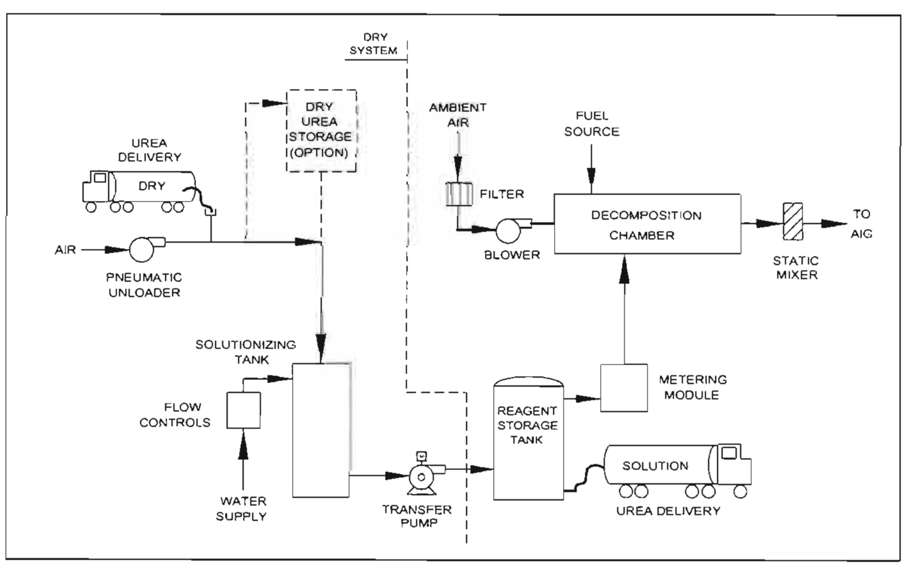
The safety advantages of a urea-based system over traditional anhydrous or aqueous ammonia-based systems are clear. Anhydrous ammonia is classified as a hazardous chemical per CAA Section 112(r). As such, ammonia requires safety procedures to protect personnel, neighboring communities, and the environment from unforeseen chemical release. Reporting, record keeping, permitting, and emergency preparedness planning are generally all needed with on-site ammonia storage. Aqueous ammonia-based systems also require specialized equipment, including pressure vessels, a heated vaporizer, and other features, and have significantly higher operating costs than urea-based systems.

In contrast, urea products are non-hazardous sources of ammonia, so their transport, storage, and use are greatly simplified. Fuel Tech has extensive, proven experience with urea-based systems, and the NO$_X$OUT ULTRA® system is built on that solid foundation.

Other urea-to-ammonia conversion systems on the market work by hydrolyzing urea on-site. These processes are complex, expensive, and include a high pressure vessel containing ammonia. NO$_X$OUT ULTRA® is a more economical and easier way to generate ammonia.

Design Simplicity

The NO$_X$OUT ULTRA® process provides ammonia for SCR systems by decomposing urea to feed the traditional ammonia injection grid (AIG). The ULTRA process relies on controlled urea decomposition reactios that occur in a chamber designed to provide an application-specific temperature and residence time. The effective temperature

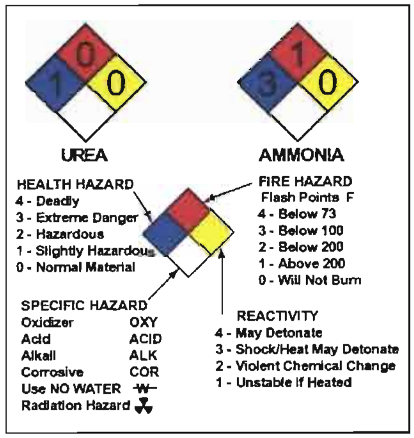


window for these decomposition reactions is 600 to 1000°F. The NO_XOUT ULTRA® system is simple, consisting of a blower, decomposition chamber, chemical pumping system, urea storage, and process controls.

Filtered ambient air is fed into the chamber through the use of a blower with automatic dampers to control discharge flow and pressure. A burner is fired downstream of the dampers, and an aqueous urea solution supplied by the storage and pumping system is sprayed into the post-combustion gases through the injectors. In the decomposition chamber, the urea is efficiently decomposed to ammonia and isocyanic acid which converts to ammonia or reduces NO_X over SCR. The outlet stream of decomposition chamber feeds the AIG for a traditional SCR system.

System Options

The NO_XOUT ULTRA® system can be customized for each application. For larger systems, an in-duct gas-to-gas heat exchanger can be supplied to preheat the process air and minimize operating costs.



The liquid portion of the system can be supplied with dilution water capability to accommodate delivery of concentrated reagent solutions.

The dry urea system components can be supplied to provide flexibility for reagent selection.

New Process, Proven Technologies

The NO_XOUT ULTRA® process incorporates commercially proven features of Fuel Tech's other NO_X reduction products. Urea storage, pumping, metering, and injection are all standard to the NO_XOUT® product line, first introduced in 1990. The NO_XOUT CASCADE® process relies on careful duct and gas flow dynamics design. The NO_XOUT SCR® system relies on the conversion of urea to ammonia for SCR reactions. So while NO_XOUT ULTRA® is a new product to our mix of process solutions, the established technologies and know-how of Fuel Tech make it a uniquely reliable urea conversion system.

The NO_XOUT ULTRA® system has all the benefits of ammonia supply for SCR without the cost, safety and environmental concerns associated with ammonia handling. More cost-effective than urea-hydrolyzing processes, NO_XOUT ULTRA® from Fuel Tech is a smart choice for simplifying SCR operation with a urea-to-ammonia conversion process.

For more information on NOxOUT ULTRA® programs available from Fuel Tech, call, fax, or write Fuel Tech at:

Fuel Tech, Inc. • 512 Kingsland Drive • Batavia, IL 60510
Phone 800.666.9688 • 630.845.4500 • Fax 630.845.4501
www.fueltechnv.com • webmaster@fueltechnv.com

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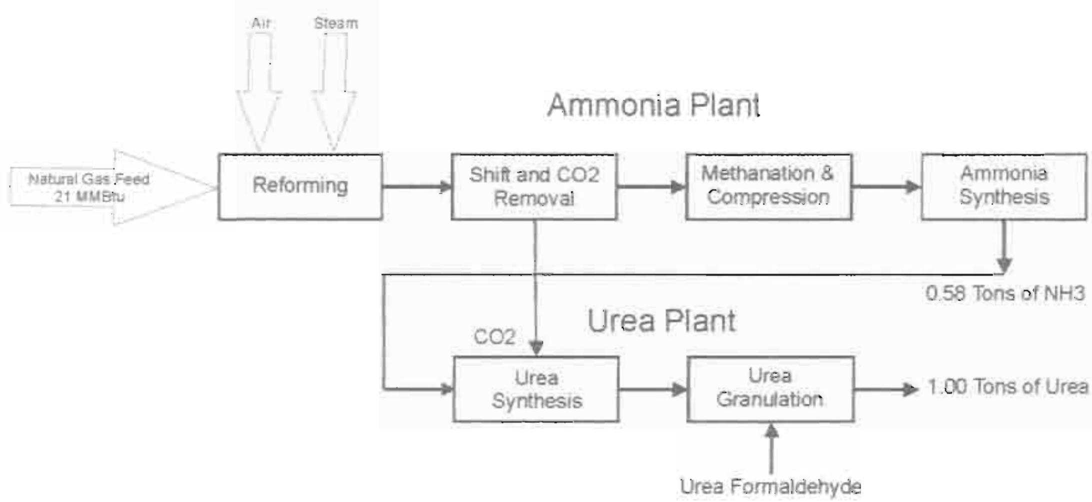
UREA – The Safe Reagent Alternative for NOx Reduction Systems

For more than two decades Selective Catalytic Reduction (SCR) systems have been deployed worldwide to provide significant reductions in NOx emissions from Utility plants and Industrial facilities. Dating back to the first European installations which began operation in 1985, anhydrous ammonia has been selected as the preferred reagent for its high nitrogen content and its effectiveness in reducing NOx in the presence of a catalyst. This European SCR experience with ammonia as the reagent was brought into the US and applied to almost all of the early SCR retrofits. More recently, aqueous ammonia in concentrations ranging from 29% to 19% has been utilized as a means of addressing the safety concerns associated with the storage and handling of anhydrous ammonia and responding to the monitoring and reporting requirements that accompany these highly hazardous, or toxic inhalation hazard (TIH) chemicals.

In just the last couple of years there have been considerable changes in the regulations that govern the transportation, storage and handling of TIH chemicals. Additionally, market conditions have changed dramatically forcing a large number of domestic ammonia production facilities to shut down and resulting in a substantial increase in nitrogen-based fertilizer and reagent imports. The purpose of this paper is to highlight some of the key pending and approved legislation that is driving current and prospective SCR owners away from anhydrous and aqueous ammonia and toward the use of on-site urea conversion technologies to produce ammonia as it is required by the SCR system.

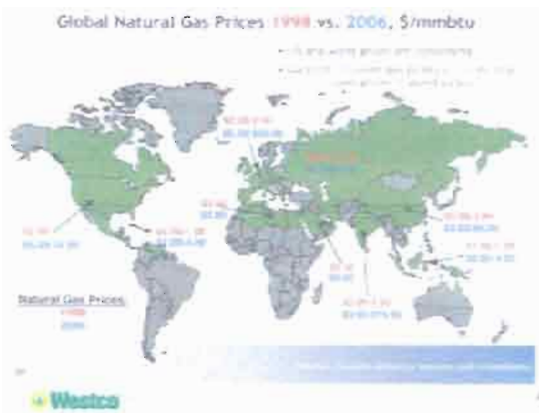
Although the rapidly changing regulatory environment is intended to be our primary focus here, it is helpful to elaborate on the role of natural gas in the production of ammonia and urea as well as the market drivers that are moving the production of these fertilizers offshore. As shown in the schematic below, natural gas is the feedstock used in the reforming process to produce ammonia and urea. Urea is typically produced and transported in a prill or granular form and then solutionized for agricultural, industrial and pharmaceutical purposes. Urea may also be taken from the process in the form or urea liquor, which is a very pure form of concentrated (70%) urea, but in terms of urea production for shipment overseas, granular urea is by far the least expensive.

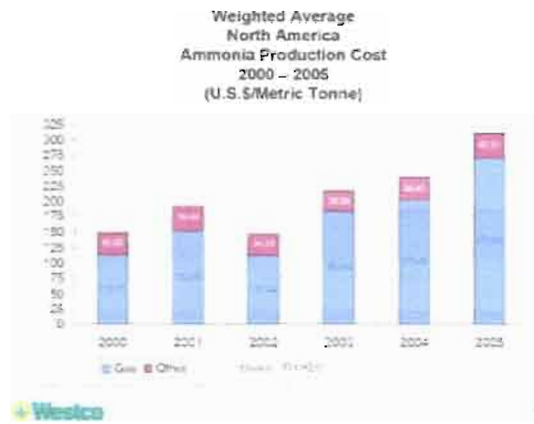


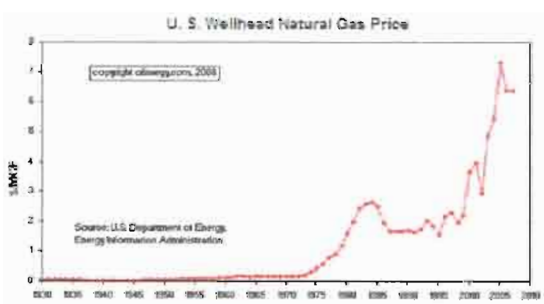
Because natural gas is the core component in the production process, the price of natural gas at the wellhead or port of entry is the primary driver in the decision to produce ammonia and urea domestically or import these chemicals from countries that have greater reserves, lower natural gas prices, and therefore a much lower cost of production.

UREA – The Safe Reagent Alternative for NOx Reduction Systems

The graphics below show a historic comparison of worldwide natural gas prices and a weighted NA ammonia production cost.







Obviously, the information contained in both of these illustrations has changed over the last couple of years, but in general, the domestic demand for nitrogen has been stable. Even though it might seem, considering the increases in SCR and SNCR systems that have been deployed in this country over the last 15-20 years, the use of nitrogen-based fertilizers far outweighs the increase in consumption by the Industrial sector. In contrast, the price of natural gas in the US has more than doubled in the last couple years, driving domestic nitrogen production down and forcing the increase in natural gas imports. The historic and current pricing for domestic natural gas is provided in the charts to the left.

The message to take away from this economic discussion is that with fertilizer production moving offshore to countries where production costs are much lower than in the US, the availability of dry urea is increasing and the fact that natural gas pricing is more stable in the countries that produce it, domestic production is expected to continue to decline.

Moving away from the economic drivers and shifting our focus to the regulatory issues facing companies that produce ammonia and urea and those that are responsible for transporting these fertilizers cross-country via motor freight and rail, it is obvious that the costs and risks associated with the production, storage and transportation are on the rise.

As mentioned in the introduction, anhydrous ammonia and aqueous ammonia (primarily in concentrations of 20% or greater) are considered by the Department of Homeland Security (DHS) to be a Toxic Inhalation Hazard, or TIH chemicals. Because large shipments of ammonia (NH3) are generally transported by railcar, the transportation and handling of these shipments have become a major issue for the railroads. New regulations require that the owners of the rail systems take "custody" of these shipments and ensure that the shipments are transported along their safest routes. These restrictions, aside from the risk that the rail companies must take on, place a financial burden on the railroads that is being passed along to their customers and eventually to the consumer. Smaller quantities can be shipped over-the road, but the potential for an accidental release is always present.

Anhydrous ammonia is a colorless, non-flammable liquefied gas that is shipped in high pressure road trailers or pressurized, insulated tank cars. Its vapor is lighter than air but when leaks do occur, the gas expands rapidly and generally hugs the ground as it spreads. As an example, a typical road trailer can hold approximately 11,500 gallons and a single rail car has a capacity of about 33,500 gallons. In the event of an accidental release, the downwind distance to the toxic endpoint – or point beyond which the concern for significant respiratory damage no longer exists – is 4.4 miles and 6.9 miles, respectively. This fact is helpful in explaining why entire towns are evacuated when a "major" release occurs.

Anhydrous ammonia is often stored at much smaller quantities to limit the potential impact of an accidental release – this quantity is known as the threshold quantity or the amount which, if present at the facility, triggers participation in the Toxic Release Inventory. The threshold quantity for anhydrous NH3 is slightly less than 2,000 gallons. However, even at 2,000 gallons, the release of this hazardous chemical can put unsuspecting families at risk as far away as 1.2 miles (please see link to RMP* COMP for calculations).

In consideration of the risk that is present for facilities that store large quantities of any of the chemical that have been assigned the term, "Chemicals of Interest", which are outlined in Appendix A of 6 CFR Part 27 (see reference on last page), the Department of Homeland Security (DHS) has issued an interim final rule which eventually is expected to provide the DHS with authority to promulgate regulations for the security of certain chemical facilities in the United States. The rule will establish risk-based performance standards for the security of our Nation's chemical facilities and will include provisions addressing inspections and audits, recordkeeping, and the protection of information that constitutes Chemical-terrorism Vulnerability Information (CVI). Finally, the rule provides the Department with authority to seek compliance through the issuance of Orders, including Orders Assessing Civil Penalty and Orders for the Cessation of Operations.

The implementation of these new rules and regulations is expected to drive the delivered price of ammonia even higher than it is today. As illustrated in the graph on the following page, urea has been tracking on a fairly steady pace while price for ammonia – even at the point of entry – has been taking fairly steep and consistent jumps. This graph also shows a recent, significant increase in the price of dry urea imports. This jump in urea pricing is directly related to an April 2008 announcement by the Chinese Finance Ministry increasing fertilizer export duties by 100%. Sources available on the Internet indicate that China produces somewhere between 20 and 30 percent of the world trade volume of fertilizers, and although there are indications that the new tariffs may be phased out in September at the end of China's fertilizer season, this dramatic increase in price and reduction in the availability of nitrogen-based fertilizers on the world market will continue to drive domestic prices even higher.

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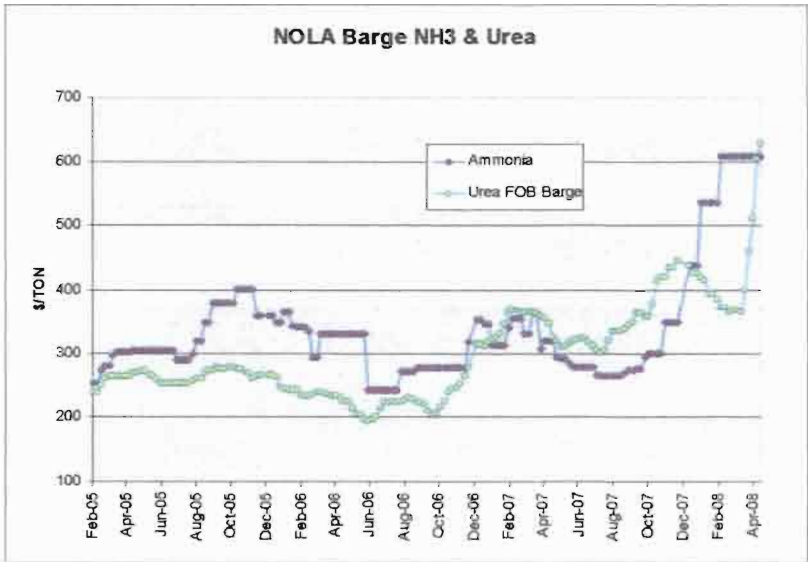
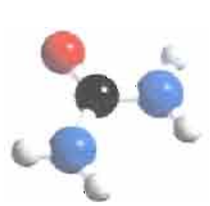


Urea is one of the largest traded worldwide commodities with more than 100 million tons produced each year. It is commercially produced from two raw materials – ammonia and carbon dioxide. Large quantities of carbon dioxide are produced during the manufacture of ammonia from coal[1] or hydrocarbons such as natural gas and petroleum-derived raw materials, which allows direct synthesis of urea from these raw materials.

Two factors contribute heavily to the facts that the US is a major importer of urea and that urea is widely used as a fertilizer and SCR reagent:



- Urea {CO(NH2)2} has the highest nitrogen content of all solid nitrogenous fertilizers in common use (46.7%) and it therefore has the lowest transportation costs per unit of nitrogen nutrient.
- Because the production of urea can eventually be traced back to natural gas, the major sources of supply are in eastern European, Asian, South American and other countries where natural gas is much less expensive than it is here in the US. This is further evidenced by the trend of domestic ammonia production facility closures and a steady increase in urea imports.

The Table on the following page provides an economic comparison of anhydrous ammonia, aqueous ammonia, and Fuel Tech's patented NOxOUT ULTRA® urea conversion process. Although the calculations do not reflect the latest increases in raw material prices, FTI can prepare an analysis for any given application using input from the client. ULTRA, the simplest of the commercially available on-site urea conversion technologies, converts liquid urea to gas phase ammonia and ammonia by-products – which contribute equally to reduction of NOx in the presence of a catalyst – via the direct injection of a concentrated liquid urea solution into a temperature-controlled environment.

[1] About 80 percent of China's urea is produced from coal, with the rest produced from natural gas.

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UREA – The Safe Reagent Alternative for NOx Reduction Systems

FUEL TECH ULTRA
ANNUALIZED CAPITAL AND OPERATING COST COMPARISON

		ULTRA	19% Aqueous Ammonia	Anhydrous Ammonia
Ammonia Required	lb/hr	[illegible]	[illegible]	[illegible]
Annual Operating Period	hrs	*8760*	*8760*	*8760*
Capacity Factor when Operating	%	*90%*	*90%*	*90%*
Projected Book Life	yrs	15	15	15
Interest Rate, %	%	10%	10%	10%
Capital Recovery Factor		0.131	0.131	0.131
Dry Reagent				
Dry Urea Price, Delivered	$/ton	*300.00*	NA	NA
Reagent Flowrate	lb/hr	938	NA	NA
Annualized Reagent Cost	$	$1,108,688	NA	NA
Water				
Reagent Concentration	%	40%	NA	NA
De-ionized water	lb/hr	1,406	NA	NA
De-ionized water	gal/hr	168.6	NA	NA
Water Cost	$/gal	0.02	NA	NA
Annualized Water Cost	$	26,587	NA	NA
Steam				
Heat Required	Btu/lb NH3	NA	6,600	455
Solutionizing Heat	Btu/lb urea	90		
Solutionizing Heat	Btu/lb water	50		
Steam Heating Value, 500 psig sat steam	Btu/lb steam	NA		
Steam Usage, 500 psig sat steam	lb/hr	NA		
Heat Required	MMBtu/hr	0.2	2.8	0.2
Steam Cost	$/MMBtu	***4.00***	***4.00***	***4.00***
Annualized Steam Cost	$	$4,878	$88,301	$7,174
Reagent Solution				
Reagent Cost, Delivered	$/ton	NA	*178.70*	*650.00*
Reagent Concentration	%	40%	19%	NA
Solution Flowrate	lb/hr	2,344	2,632	500
Solution Flowrate	gal/hr	246.7	NA	NA
Delivered Cost	$/gal	1.20	NA	NA
Annualized Reagent Cost	$	$2,334,079	$1,833,030	$1,281,150
Power				
Process Fan Motor	kw	75	0	0
Dilution Fan Motor	kw	75	75	75
Solutionizing/Transfer Pump	kw	20	0	0
Unit Circulation Pump	kw	15	0	0
Metering Pump	kw	0.6	0	0
Total Power	kw	185.5	75	75
Power Rate	$/kwh	0.03	0.03	0.03
Annualized Power Cost	$	$43,874	$17,739	$17,739
Decomposition Chamber Heat Input				
Heat Required	MMBtu/hr	**5.5**	0	0
Heat Source Cost (Natural Gas)	$/MMBtu	***7.00***	***$0.00***	***$0.00***
Annualized Heat Input Cost	$	$303,534	$0	$0
Annual Operating Costs				
Reagent Cost (Dry Urea Basis)		$1,108,688	$1,833,030	$1,281,150
Water Cost		$26,587	NA	NA
Power Cost		$43,874	$17,739	$17,739
Steam Cost		$4,878	$88,301	$7,174
Annualized Heat Input Cost		$303,534	$0	$0
Subtotal Annual Operating Costs		$1,487,561	$1,939,070	$1,306,063
Number of Units	1			
Grand Total Operating Costs		$1,487,561	$1,939,070	$1,306,063
Capital Costs				
Equipment and Engineering Cost	1 system	$1,400,000	$800,000	$500,000
Installation Cost (% of Equipment)		40%	30%	40%
Installation Cost		$560,000	$240,000	$200,000
Total Installed Cost		$1,960,000	$1,040,000	$700,000
Annualized Capital Cost		$257,689	$136,733	$92,032
Total Annualized Costs	**$**	**$1,745,250**	**$2,075,803**	**$1,398,095**

UREA – The Safe Reagent Alternative for NOx Reduction Systems

WWW REFERENCE SITES

US EPA EMERGENCY MANAGEMENT – RISK MANAGEMENT PROGRAM (RMP) RULE
http://www.epa.gov/emergencies/content/rmp/index.htm

Under the authority of section 112(r) of the Clean Air Act, the Chemical Accident Prevention Provisions require facilities that produce, handle, process, distribute, or store certain chemicals to develop a Risk Management Program, prepare a Risk Management Plan (RMP), and submit the RMP to EPA. Covered facilities were initially required to comply with the rule in 1999, and the rule has been amended on several occasions since then, most recently in 2004.

EPA EMERGENCY MGMT – EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW ACT (EPCRA)
http://www.epa.gov/emergencies/content/epcra/index.htm

The Emergency Planning and Community Right-to-Know Act (EPCRA) was created to help communities plan for emergencies involving hazardous substances. EPCRA has four major provisions: one that deals with emergency planning and three that deal with chemical reporting.

EMERGENCY MANAGEMENT – RMP* COMP DOWNLOAD
http://www.epa.gov/oem/content/rmp/rmp_comp.htm

RMP*Comp is a free program you can use to complete the offsite consequence analyses (both worst case scenarios and alternative scenarios) required under the Risk Management Program rule. When you use RMP*Comp, you don't need to make any calculations by hand and the program guides you through the process of making an analysis.

RAIL SECURITY, TRANSPORT OF TOXIC INHALATION HAZARD (TIH) MATERIALS, CHAIN OF CUSTODY
http://www.tsa.gov/press/where_we_stand/rail_security_facts.shtm

Since the terrorist attacks of September 11, 2001, the 7/7 London subway bombings, and the Madrid rail bombings, the Department of Homeland Security (DHS) has taken several steps to manage risk and strengthen our nation's rail and transit systems by:

- Providing funding to state and local partners;
- Training and deploying manpower and assets for high risk areas;
- Developing and testing new technologies, and;
- Performing security assessments of systems across the country.

http://www.tsa.gov/assets/pdf/Supplement_No%201_TIH-SAI.pdf

This document contains recommended security action items for the rail transportation of materials poisonous by inhalation, commonly referred to as Toxic Inhalation Hazard (TIH) 1 materials. Adoption of these measures is voluntary. Movement of large quantities of TIH materials by rail in proximity to population centers warrants special consideration and attention. These materials have the potential of causing significant numbers of fatalities and injuries if intentionally released in an urban environment.

DHS CRITICAL INFRASTRUCTURE – CHEMICAL SECURITY
http://www.dhs.gov/xprevprot/programs/gc_1169501486179.shtm

Critical Infrastructure: Chemical Security

Responsibility for chemical security is shared among federal, state, and local governments, as well as the private sector. The Department of Homeland Security has issued Chemical Facility Anti-Terrorism Standards for any facility that manufactures, uses, stores, or distributes certain chemicals above a specified quantity.

Government and industry must work together to strengthen the security of America's chemical facilities, while not undercutting an important part of the nation's economy.

DHS CHEMICALS OF INTEREST – APPENDIX A
http://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf
6 CFR Part 27 – Appendix to Chemical Facility Anti-Terrorism Standards; Final Rule

DHS CHEMICAL SECURITY – LAWS AND REGULATIONS, CHEMICAL SECURITY
http://www.dhs.gov/xprevprot/laws/
Homeland Security Appropriations Act of 2007 H.R.5441 Sec 550 (Public Law 109-295) *(PDF, 109 pages - 289 KB)* Enacted October 4, 2006. An Act of Congress mandating that the Secretary of the Department of Homeland Security establish risk-based performance standards for the security of chemical facilities within six months of the enactment of the Act. Also mandated was the development of vulnerability assessments as well as the development and implementation of site security plans for chemical facilities. The Chemical Facility Anti-Terrorism Standard (CFATS) was created to fulfill the requirements of this Act.

HAZARDOUS MATERIALS – ENHANCING RAIL TRANSPORTATION SAFETY AND SECURITY FOR HAZARDOUS MATERAILS SHIPMENTS, PROPOSED RULE
http://hazmat.dot.gov/regs/notices/nprm/71fr-76833.htm
SUMMARY: The Pipeline and Hazardous Materials Safety Administration (PHMSA), in consultation with the Federal Railroad Administration (FRA) and the Transportation Security Administration (TSA), is proposing to revise the current requirements in the Hazardous Materials Regulations applicable to the safe and secure transportation of hazardous materials transported in commerce by rail. Specifically, we are proposing to require rail carriers to compile annual data on specified shipments of hazardous materials, use the data to analyze safety and security risks along rail transportation routes where those materials are transported, assess alternative routing options, and make routing decisions based on those assessments. We are also proposing clarifications of the current security plan requirements to address en route storage, delays in transit, delivery notification, and additional security inspection requirements for hazardous materials shipments. In today's edition of the Federal Register, TSA is publishing an NPRM proposing additional security requirements for rail transportation.

NATURAL GAS PRICING – DIRECT RELATIONSHIP WITH NH3/UREA PRICING AND SOURCING
http://www.oilnergy.com/1gnymex.htm#year

AGRICULTURAL COOPS DESIGNED TO HEDGE NH3 PRICE VOLATILITY
http://farmindustrynews.com/mag/farming_global_granular_shift/index.html
Granular future The importance of the global marketplace for nitrogen fertilizer – and the reason granular urea has a strong future in the US – is underlined by the fact that in 2004 55% of US nitrogen was imported, up from 40% just a few years ago. That percentage is expected to continue to grow as global competition continues to put the squeeze on domestically produced nitrogen.

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Reagent Supply for SCR System Cost Analysis for 5 lb/hr SCR Ammonia Demand Example 5 MW Combined Cycle Co Generation					
Technology Comparisons					
Parameter	**Aqueous Ammonia**	**Urea Solution (NOxOUT ULTRA®)**	**Cost Adder Ammonia**	**Cost Adder ULTRA**	**Comment**
Flow control to AIG	√	√			Both require flow and distribution of gas
PLC controls	√	√			Similar controls required, signal from source indicates ammonia demand
Liquid Metering	√	√			Both are metering liquids to meet the respective equivalent ammonia demand
Air Blower Fans	√	√		+	ULTRA requires more carrier air
Vaporization	√	√			Both require water removal, ammonia-81% water, urea-60% water
Decomposition		√		+	The decomposition of the urea requires a more robust vessel than simple vaporization
Air Heating Elements	√	√		+	ULTRA requires more heat input to both vaporize the water and decompose the urea to ammonia products
Insulation of Equipment	√	√			Both require gas discharge to AIG to be insulated
Estimated Value of Cost Adders					
Storage Tank Containment	√		$18,000.00		Ammonia requires a containment basin or double walled tank, containment is an often selected option for urea
Storage Tank Leak Detection	√		$4,000.00		Often in space of double walled tank
Risk Management Prevention Plan RMPP	√		$50,000.00		Required for permit and to acquire liability insurance
Liability Insurance, **per year**	√		$180,000.00		$10 million coverage for person property and environmental damage, $100K deductable per incident
Haz Mat Training & Reporting, **per year**	√		$25,000.00		For permit and insurance requirements to keep hazard material on site
Higher Cost Reagent, **per year**		√		$13,000.00	Urea has a higher cost than ammonia
Total of Cost Adders			$277,000.00	$13,000.00	Cost not typically included in capital cost, or included in scope from others
Estimated Capital Cost	$250,000.00	$320,000.00			Normal Capital Cost, without installation (which will be similar for both technologies)
Net Cost of Technology	$527,000.00	$333,000.00			A Urea based system or ULTRA can be **40% less in total cost** than a Ammonia System
Avoided Cost for each incident					
One Day Outage due to Supply Chain	√		$24,000.00		$0.14 kw sales lost or purchased power cost, per turbine down, value is increased by number of turbines on site
One Day Outage due to Leak or Spill	√		$24,000.00		$0.14 kw sales lost or purchased power cost, per turbine down, value is increased by number of turbines on site
Cost for Spill Recovery and Damage to Person Property and Environment	√		$100,000.00		Liability Deductible, plus risk of premium increase, public relations liability and criminal libability